CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 93-015

REISSUANCE OF WASTE DISCHARGE REQUIREMENTS FOR:

U.S. ARMY CORPS OF ENGINEERS, SAN FRANCISCO DISTRICT

CALENDAR YEARS 1993 THROUGH 1994

MAINTENANCE DREDGING AND DISPOSAL SITE MANAGEMENT

The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board), finds that:

1. The U.S. Army Corps of Engineers, San Francisco District (hereinafter the Discharger) maintains the navigability of Federally authorized channels in the San Francisco Bay.

2. The Discharger's dredging proposal consists of the San Pablo Bay-Mare Island Strait, the Richmond Harbor, the Oakland Harbor, Suisun Bay Channel, Petaluma(Across-the-Flats), San Pablo Bay-Pinole, San Rafael Creek (River Channel) and Suisun Channel (Slough) projects remove accumulated sediment (primarily silt and clay) by hydraulic (e.g. self-propelled hopper; hydraulic cutter head) or mechanical (e.g. clamshell) dredge and disposes of the material by either self-propelled hopper or dump scow at a designated aquatic disposal site. Additionally, the Discharger carries out dredging and disposal at upland locations for the following projects: San Leandro Marina, Napa River, New York Slough and Petaluma River-across the flat.

3. The San Pablo Bay - Mare Island Strait project historically removes between 255,000 and 2.3 million cubic yards and disposes of the material at the U.S. Army Corps of Engineers (COE) identified site in Carquinez Strait (SF-9).

4. The Richmond Harbor project historically removes between 129,000 and 1.2 million cubic yards and disposes of the material at the COE identified site west of Alcatraz Island (SF-11).

5. The Oakland Harbor project historically removes between 113,000 and 870,000 cubic yards annually and disposes of material at the COE identified site west of Alcatraz Island (SF-11).

6. The Suisun Bay Channel project historically removes between 29,000 and 567,000 cubic yards annually and disposes of the primarily sandy material at the Suisun Bay disposal site (not numbered).

7. The Petaluma (Across-the-Flats) project historically removes between 266,000 and 788,000 cubic yards every three years and disposes of the material at the COE identified site in San Pablo Bay (SF-10).

8. The San Pablo Bay-Pinole project historically removes between 47,000 and 2.3 million cubic yards every two years and disposes of the material at the COE identified site in San Pablo Bay (SF-10).

9. The San Rafael Creek (across the Flat) project historically removes between 127,000 and 200,000 cubic yards every three years and disposes of the material at the COE identified site west of Alcatraz Island (SF-11).

10. The Redwood City Harbor project historically removes between 244,000 and 910,000 cubic yards every three years and disposes of the material in the COE identified site west of Alcatraz Island (SF-11).

11. The Discharger as a lead agency has determined that the proposed project and its impacts are similar to those considered in the Final Composite Environmental Impact Statement on Maintenance Dredging, Existing Navigation Projects, San Francisco Bay Region, California, December 1975. Therefore, no further environmental documentation is required to comply with NEPA for the 1993-1994 maintenance dredging. In addition, the proposed maintenance dredging is exempt from CEQA pursuant to Section 15304(g) of the Resources Code because the material is to be deposited at a site formally approved by EPA and COE.

12. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region (the Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives for San Francisco Bay. The Regional Board adopted an amendment to the Basin Plan on the Regulation of Dredged Sediment Disposal in the San Francisco Bay on July 19, 1989. The State Board approved the Basin Plan amendment on January 18, 1990.

13. Dredging activities and disposal at dispersive sites is known to temporarily increase the suspended sediments in the Bay.

14. The Regional Board recognizes that the continued disposal of maintenance work will require a demonstration that there are no significant or irreversible impacts occurring from the disposal of maintenance dredged material in San Francisco Bay. The Regional Board recognizes the COE expertise in this area and encourages the COE to implement the Long Term Management Plan (LTMS) for dredged material. The Regional Board will continue to participate in the development and review of LTMS studies and activities.

15. The disposal of dredged sediment in San Francisco Bay is suspected of having an adverse impact on some of the Estuary's beneficial uses. In order to assess the impacts to the Bay's resources from dredging, and dredged material disposal, comprehensive and detailed studies of dredging and dredged material disposal and their relationship to all chemical, physical and biological processes are necessary.

16. Little information is available to assess the cumulative and long-term effects of this activity. Therefore, studies are warranted to better ascertain what effects are occurring and the feasibility of mitigating these impacts by the application of technology and best management practices. Of particular concern is the impact of how dredge disposal alters current pattern and dispersion of sediment in the Estuary, the effects of suspended sediment on turbidity, and how dredge disposal effects the bioavailability of toxic substances and subsequent acute and chronic effects in the Estuary. The Regional Board recognizes the lack of information about these concerns and therefore endorses a study-based approach to monitor the effects of dredging and dredge disposal.

17. The Long Term Management Strategy (LTMS) study plan includes a description and implementation schedule for the following tasks: (1) shoaling rates and pre- and post-dredge bathymetric surveys at project sites to be utilized and a dredging minimization study, (2) investigation of in-situ bioaccumulation effects on biota at and surrounding the disposal site, (3) a suspended sediment investigation to define the fate of suspended material resulting from disposal activities, and (4) a detailed report of dredging activities, monitoring data, and the assessment conducted to determine the physical, chemical, and biological impacts of the disposal activities.

18. The Discharger assisted in the development of a Broad framework for regional monitoring of dredged sediment; however, there is no provision in the LTMS for implementation of a comprehensive regional monitoring program.

19. The Regional Board, as part of the San Francisco Estuary Project, is developing a Regional Monitoring Strategy for pollutants, dredging, biological resources, land use and freshwater flows.

20. The Regional Board implemented the Regional Monitoring Program (RMP) in April of 1992. The RMP is a coordinated and comprehensive, long-term monitoring program which will provide resources for the monitoring of water and sediment quality to determine compliance with relevant numerical objectives, and to study bioaccumulation, at an array of Bay locations. Additionally, the RMP provides for focused studies of "problematic" issues faced by the dredging community and other Bay Area dischargers (e.g. reference site characterization, bioaccumulation of toxic substances in fish for human consumption).

21. In addition to monitoring of pollutants and toxicity, the Regional Board has implemented monitoring of ambient suspended sediment in South San Francisco Bay. LTMS has implemented a compatible monitoring program for Central San Francisco Bay.

22. The Discharger has conducted studies which show that dredged material from the Pinole Shoal and Suisun Bay Channel (Findings No. 6, 8) is primarily sand that has readily identifiable beneficial uses.

23. Dredged material from the Pinole Shoal and Suisun Bay Channel are disposed of at the San Pablo Bay and Suisun Bay disposal sites, respectively.

24. The Suisun Bay Channel disposal site is routinely dredged by a commercial sand mining company.

25. The Discharger has conducted surveys of the Alcatraz disposal site (SF-11) which show a decline in depth and unexpected bottom topography ("mounding").

26. The Alcatraz disposal site is operated as a "dispersive" site, that is material disposed of at the site disperses and the site remains at a relatively constant depth.

27. The LTMS is developing alternative disposal options which may result in changing the designated disposal sites for the aforementioned projects in order to maximize beneficial uses of the dredged sediment.

28. Target volumes for the dredged material disposal sites are contained in the Basin Plan as follows.

    The maximum monthly volume targets cubic yards (C.Y.) of dredge sediment allowed for disposal at each site are:

Site	Target Volume(C.Y.)
Alcatraz (SF-11)	
October - April	1.0 million
May - September	0.3 million
Carquinez Strait (SF-9)	
(any month)	1.0 million
San Pablo Bay (SF-10)	0.5 million

    The maximum annual volume targets in cubic yards (C.Y.) for each calendar year at each disposal site are:

Site	Target Volume(C.Y.)
Alcatraz (SF-11)	4.0 million
Carquinez Strait (SF-9)	2.0 million (NY) 3.0 million (WY)
San Pablo Bay (SF-10)	0.5 million

The volume targets for the Carquinez Strait disposal site are 3.0 million cubic yards for wet and above normal years (WY) and 2.0 million cubic yards for all other year classification (NY). Water year classification are designated by the California Department of Water Resources (DWR).

29. In response to mounding problems, the Regional Board and Discharger propose to significantly reduce the allowable monthly disposal rates and volumes at the Alcatraz site (COE Public Notice No. 93 -3). The revised target volumes are proposed and subject to change based upon the outcome of public review.

30. For disposal of dredged material at the Alcatraz site (SF-11), the Discharger has implemented guidelines for sediment testing which require the dredge disposal permittee to compare test results against the Alcatraz site "Environs" reference. The Alcatraz Environs is a composite of eight points which surround the disposal site. In that the disposal site is highly dynamic, the Environs reference was implemented in order to better assess local "background" conditions.

31. The beneficial uses of San Francisco Bay in the vicinity of the dredging and disposal areas are:

    a. Fish migration and spawning
    b. Estuarine habitat
    c. Wildlife habitat
    d. Preservation of rare and endangered species
    e. Water contact and non-contact water recreation
    f. Shellfish harvesting
    g. Commercial and sport fishing
    h. Navigation
    i. Industrial process and service supply

32. The study of the impacts of bay disposal is a long-term project and will be incorporated into all future Waste Discharge Requirements of the Discharger.

33. The Discharger and interested persons have been notified of the Regional Board's intent to issue requirements for the discharge and have been provided

with the opportunity to submit their written comments.

34. The Regional Board, in a properly noticed public hearing on February 17, 1993, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code and regulations adopted thereunder and to the provisions of the Federal Water Pollution Control Act, as amended, and regulations and guidelines adopted thereunder, that the Discharger shall comply with the following:

A. RECEIVING WATER LIMITATIONS

1. The dredging and disposal activities shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. The discharge of waste shall not cause the following conditions to exist in waters of the State that cause a nuisance or adversely affect beneficial uses at any place:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam;

   b. Aquatic growths;

   c. Significant alteration of temperature, turbidity, or apparent color beyond present natural background levels;

   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;

   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

3. The discharge of waste shall not cause the following limits to be exceeded in waters of the State in any place within one foot of the water surface:

a.	Dissolved Oxygen	5.0 mg/l minimum. Median of any three consecutive months shall not be less than 80% saturation. When natural factors cause lesser concentration(s) than those specified above, then this discharge shall not cause further reduction in the concentration of dissolved oxygen.
b.	Dissolved sulfide	0.1 mg/l maximum

c.	pH	Variation from natural ambient pH by more than 0.5 pH units.
d.	Un-ionized ammonia	0.025 mg/l as N Annual Median 0.16 mg/l as N Maximum
e.	Turbidity	The turbidity of the waters of the state at any point beyond 200 feet outside of the disposal area shall not increase above background levels by more than the following:

Receiving Water Background	Incremental Increase
< 50 units	5 units, maximum
50 - 100 units	10 units, maximum
> 100 units	10% of background, max

4. The Discharger shall not cause a violation of any applicable water quality objectives for receiving waters adopted by the Regional Board and the State Water Resources Control Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

B. PROVISIONS

1. A quarterly summary report (Quarterly Report) of all Bay Area dredging activities shall be submitted in accordance with the attached Self-Monitoring Program. The Report shall include a discussion of the results of monitoring described by sections 2 though 4 of these Provisions.

2. Dredging Activities: The Discharger shall provide a summary of quantities, and periods in which dredging occurred and provide maps which clearly indicate the areas dredged during that quarter.

3. Disposal Site Activities: The Discharger shall provide a summary and discussion of disposal site capacity and topography. The report shall include recent bathymetric surveys and shoaling rates for that quarter. The Report shall contain graphical summaries of total site usage by all dredgers, and shall summarize site usage in accordance with the attached Self-Monitoring Program.

4. Disposal Site Volume Targets: The Discharger shall comply with the draft policy on Alcatraz Disposal Site management as described in Public Notice 93-3, or any

subsequent final policy.

5. Disposal Site Sediment Monitoring: The Discharger shall report the results of sediment sampling and analysis at disposal sites including physical, chemical and biological testing which is carried out to determine the reference condition of the site. This testing and analyses shall also be implemented for the purpose of determining any trends in reference site quality. The Disposal site monitoring shall be conducted in accordance with the attached Self-Monitoring Program. Monitoring of the Alcatraz site shall include the Alcatraz Environs.

6. The Discharger shall conduct physical, chemical, and biological sediment characterization of the sediment to be disposed in San Francisco Bay in accordance with approved protocols and guidelines (e.g., Public Notice 93-2) or protocols approved by the Regional Board's Executive Officer, and as described in the attached Self-Monitoring Program. A sediment characterization shall be filed with the Regional Board for the approval by the Executive Officer, at least 30-days prior to commencement of dredging.

7. The Discharger shall immediately begin implementation of the Regional Monitoring Plan for dredging and dredged disposal. Progress in implementing this Plan shall be included in the Quarterly Reports to the Regional Board. Alternately, the Discharger may elect to participate in the Regional Board's Regional Monitoring Program (RMP). Participation in the RMP is subject to approval by the Regional Board.

8. The Discharger shall prepare an Annual Progress Report and presentation (Annual Report) to the Regional Board which will describe the activities of the previous year and measures taken by the Discharger to minimize or eliminate threats or impacts to waters of the state and associated beneficial uses. The Annual Report shall discuss in detail, efforts made to enter into contacts or agreements which allow for the beneficial use of dredged material and other upland disposal alternatives.

9. The Discharger shall submit a feasibility study plan for approval by the Executive Officer, for beneficial use of sand dredged as a part of channel maintenance. A multi-step feasibility study is required as described in the Self-Monitoring Program.

10. The Discharger shall carry out ambient suspended particulate monitoring in accordance with the Regional Board's study plan for Fate of Dredged Material as described by the United States Geological Survey (USGS) in the attached Self-Monitoring Program.

11. The discharge of dredged materials to the waters of the State shall cease immediately whenever violations of requirements are detected by the self-monitoring program or inspections by Regional Board staff as determined by the Executive Officer, and the discharge shall not resume until compliance can

be assured to the Executive Officer's satisfaction.

12. The Discharger shall analyze, through NEPA process, the impacts of dredging on herring spawning, in applicable regions, as determined by the Department of Fish and Game with concurrence of the Executive Officer.

13. The Executive Officer, in consultation with the District Engineer shall make a determination for each maintenance dredging episode of the appropriateness of in-Bay disposal and may require disposal at another site in order to meet overall dredged material management goals.

14. The Discharger shall comply with all sections of this Order immediately upon commencement of dredged material disposal.

15. The Discharger shall permit the Regional Board or its authorized representative in accordance with California Water Code Section 13267(c):

    a. Entry upon premises in which any required records are kept.

    b. Access to copy any records required to be kept under terms and conditions of this order.

    c. Inspection of monitoring equipment or records.

    d. Sampling of any discharge.

16. The Discharger shall comply with all applicable items of the attached "Standard Provisions, Reporting Requirements and Definitions" dated December 1986.

17. This Order supersedes Order 90-044.

18. This Order will expire on March 1, 1995, and upon submittal of all required reports to the satisfaction of the Executive Officer.

I, Steven R. Ritchie, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on February 17, 1993.

Steven R. Ritchie
Executive Officer

File No. 1535.05
Attachment: Self-Monitoring Program

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

U.S. ARMY CORPS OF ENGINEERS

MAINTENANCE DREDGING
AND
DISPOSAL SITE MANAGEMENT

FOR

CALENDAR YEAR 1993-1994

ORDER NO. 93-015

I. GENERAL REQUIREMENTS

Reporting responsibilities of Dischargers are specified in Sections 13260(a), 13268, 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16. The principal purposes of a monitoring program by a Discharger, also referred to as a self-monitoring program are to (1) document compliance with waste discharge requirements and prohibitions established by this Regional Board and (2) facilitate self-policing by the Discharger in the prevention and abatement of pollution arising from waste discharge.

For the Discharger's maintenance dredging, calendar years 1993-1994, quarterly reporting of environmental monitoring and assessment is required. A study plan for monitoring the impacts of dredge disposal must be submitted for approval by the Executive Officer with in two months of issuance of these Requirements.

The Discharger shall conduct all physical, chemical, and biological testing and sediment characterization in accordance with Standard Methods Manual for Environmental Sampling and Analysis in San Francisco Bay, Battelle 1992, or other methods and protocol approved by the Regional Board's Executive Officer. Sampling and analyses of dredged material shall be in accordance with Testing Guidelines For Disposal of Dredged Material Disposal, USACOE Public Notice 93-2.

II. ROUTINE MONITORING

A. Dredging Sites

1. Pre- and post-dredging bathymetric surveys at each dredge site.

2. Sediment chemical and biological characterization shall be conducted at each proposed site following Public Notice 93-2.

3. A characterization of physical, chemical, and biological characterization shall be filed with the Regional Board, for the approval of the Executive Officer, at least 30 days prior to commencement of dredging at any site.

B. Disposal Sites Activities:

For all designated in-Bay disposal sites, quarterly reports shall include the following:

1. Disposal site capacity including most recent bathymetric surveys and shoaling rates. The Report shall contain graphical summaries of total site usage by all dredgers and shall summarize the following:

(a) quantity disposed of per load and equipment used
(b) identity of project including name of permittee and corresponding Public Notice number,
(c) type of material disposed (i.e, slurry, clam-shell, new work-native, etc)
(d) time of day
(e) frequency of disposal site usage

C. SPECIAL STUDIES AND MONITORING

1. The Discharger shall submit a plan describing the feasibility of beneficial uses of sand which is dredged during the course of routine channel maintenance dredging. The Plan shall describe in detail how sandy sediment can be transferred to an upland site, potential end uses, and an approach to contracting with public or private entities for transportation and end use or market. In drafting the Plan, the Discharger should refer and discuss previous reports conducted by the Discharger on this subject (Attachment B). After conducting the feasibility study, the Discharger shall present its findings to the Regional Board in a Progress Report according to the following schedule:

The Plan shall be implemented according to the following schedule:

April 30, 1993	Submit feasibility study plan for review.
May 30, 1993	Report on project-specific sediment characteristics and compatible end uses.
June 30, 1993	Report on end uses, users and markets.
August 31, 1993	Submit Report on contract outcomes
November 17, 1993	Present Progress Report on sand beneficial uses.
December 31, 1993	Submit Plan for implementation of upland use of dredged sands.

2. The Discharger shall monitor suspended particulate material as follows:

   a. From October 1993 through September 1995, the Discharger shall continue collection of salinity and sediment concentration time series data begun under the LTMS program.

   b. This work consists of data collection at Point San Pablo, the west side of the Bay Bridge, and Fort Point (Gate) as outlined in the proposal from the United States Geological Survey (USGS), entitled Factors Controlling Suspended Sediments in Central San Francisco Bay, CA, dated May 10, 1992.

3. Implementation or funding of the USGS study, as described above, will constitute participation in the Regional Monitoring Program as described by the Regional Board's Regional Monitoring Plan.

III. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Begin Dredging: Report by telephone to the Regional Board five days ahead of the scheduled date of commencement of dredging operation.

2. Non-Compliance: In the event the Discharger is unable to comply with the conditions of the waste discharge requirements and prohibitions, the Discharger shall notify the Regional Board Office by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written report shall include pertinent information explaining reasons for the non-compliance and shall indicate what steps were taken to prevent the problem from recurring.

3. Quarterly Reports: A quarterly report and a summary of findings shall be submitted to the Executive Officer **30 days** after conclusion of maintenance dredging activities. This report should include data summaries in tabular and graphical form, methods employed, monitoring and assessment findings, impacts of disposal activities on beneficial uses, and recommendations for disposal practices and monitoring and assessment activities for future operations.

4. The written report shall contain a statement by the District Engineer, San Francisco District, COE or his designee, under penalty of perjury, that to the best of the signer's knowledge the report is true and correct.

I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedures set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Regional Board Order No. 93-015.

2. Is effective on March 1, 1993.

3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the Discharger and revisions will be ordered by the Executive Officer.

Steven R. Ritchie
Executive Officer

Attachments:

1. Regional Monitoring Program

2. List of Sand Reuse Studies and Recommendations

REGIONAL MONITORING PLAN FOR FY 1992-1993

I. Baseline Monitoring (Funded by Dischargers - $1,150,000)

During FY 1991-1992 the Regional Board conducted a Pilot Regional Monitoring Program, funded by the Bay Protection and Toxic Cleanup Program, that included the monitoring of chemical concentrations in water, sediment and tissues and the measurement of toxicity in water and sediments throughout the San Francisco Estuary. This monitoring will be continued in FY 1992-1993. The purposes of continuing this monitoring are: 1) to determine compliance with water quality objectives, 2) to obtain data for the development of sediment quality objectives and, 3) to maintain a longterm database so that temporal changes in the San Francisco Estuary can be evaluated. In FY 92-93 a consortium of dischargers will fund this part of the program. Implementation of a longterm Regional Monitoring Program for toxics is required by the Bay Protection Program and will serve as the first implemented part of the Regional Monitoring Program as envisioned by the San Francisco Estuary Project.

A. Water Column Monitoring - Low level detection methods will be used to measure concentrations of metals, PAHs, PCBs, DDTs and other organics at a subset of stations sampled in 1991-1992. Sixteen baseline stations will be monitored three times a year, once during the wet season (November -April) and twice during the dry season (May-October). These stations are listed in Table 1. River stations (Sacramento and San Joaquin) will be monitored bimonthly to determine inputs to San Francisco Bay. Chronic toxicity will be measured using three toxicity tests at a subset of these stations.

B. Sediment Monitoring - Sediment chemistry and toxicity will be measured at 15 baseline stations three times a year, once during the wet and twice during the dry season. Sediment extracts from all samples will be archived. Three toxicity tests will be performed on the sediment from each station. These tests may include but will not be limited to the amphipod mortality test and bivalve larvae or echinoderm developmental test. Additional tests will be added based on results from monitoring and gradient studies. Toxicity tests will include analyses for salinity, dissolved oxygen, pH, temperature and ammonia. Reference toxicants and negative controls will be run with all tests. In addition, fine grain reference sediment will be run with any tests that may be sensitive to grain size effects.

C. Bioaccumulation - Bioaccumulation will be measured in shellfish at our routine 11 Mussel Watch stations twice a year, once during the wet and once during the dry seasons. Tissue extracts from all samples will be archived. Protocols and QAQC procedures will be the same as being used by the State Mussel Watch Program except the a standard time of deployment will be used at all stations.

Attachment 1.

D. Data Management/QAPP/Annual Report - In 1991-1992 a data management strategy was developed to integrate the work of the various studies in the Regional Monitoring Program, data for local monitoring programs and historical data. In order to make this a working data management system additional work needs to be performed. In 1991-1992 a strategy was developed to manage all of the above data and a system was designed to include Regional Monitoring Program data. The data management system needs to be expanded to incorporate all of the above data. This would include designing the system, putting data into the system, revising the system based on data input and adding tools to manipulate data.

A thorough Quality Assurance Project Plan (QAPP) will be submitted for each element of the Baseline Monitoring Program. The QAPP will include details of the QA/QC program as well as thorough descriptions of protocols used in the studies.

An annual report will be submitted which will describe the Baseline Monitoring Program and protocols used in the program, analyze data with appropriate statistical procedures, and discuss results.

TABLE 1

List of Stations for Baseline Monitoring (16)

1. Extreme South Bay
2. Dumbarton Bridge
3. Redwood Creek
4. Oyster Point
5. Yerba Buena Island
6. Richardson Bay
7. Staufer
8. Petaluma River
9. Pinole Point
10. Davis Point
11. Napa River
12. Pacheco Creek
13. Grizzly Bay
14. Sacramento River north of Sherman Island
15. San Joaquin River at Antioch Point
16. Ocean Station off of the Golden Gate

II. Focused Sediment Monitoring - (Funded by the Bay Protection and Toxic Cleanup Program - $225,000) - As a result of the Regional Board's Pilot Sediment Monitoring Program in 1991-1992 several important issues arose that need to be resolved in order to be able to interpret sediment monitoring data in the San Francisco Estuary and the rest of the state.

During a study to locate a fine grain sediment reference site in the San Francisco Bay area significant toxicity was observed in areas with low chemical concentrations in the sediment and no significant sources of toxic contamination. These areas were Bolinas Lagoon, Drakes Estero and Tomales Bay. Toxicity was also observed in Tomales Bay in a previous NOAA study when chemical concentrations in the sediment were low.

Investigations of the causes of toxicity in these areas are extremely important to be able to interpret sediment toxicity data. Evidently, there is something causing toxicity in these "pristine" areas that is not being measured. There is some evidence that ammonia naturally occurring in the sediment or being generated in toxicity tests might be the cause. Chemicals from geologic formations or naturally occurring biocides might also be a cause. If toxicity is being caused from a naturally occurring substance, either naturally occurring in the sediment or as an artifact of toxicity test protocols, and this substance is not regularly measured, the results of sediment toxicity tests could be called in to question.

The purposes of the reference site characterization are to: 1) identify a "clean" fine grain reference site and 2) determine the cause of toxicity in sites with low sediment chemistry and no significant sources of contamination.

Reference site characterization will take place in two phases. In the first phase six sites will be evaluated in order to identify a "clean" fine grain reference site. The six sites will be Bolinas Lagoon, Drakes Estero, San Pablo Bay, Monterey Bay and two sites in Tomales Bay. The second phase will consist of determining the cause of toxicity at sites which exhibit toxicity and yet have low concentrations of contaminants. The standard protocol for sediment toxicity investigation evaluations (TIEs) will be used to determine the cause of toxicity at these sites, however, variations on that protocol will need to be developed for saltwater sites.

We would like to conduct a full chemical analysis and three toxicity tests at each site on a quarterly basis. When toxicity is found in any sample a thorough evaluation of the chemical analysis will be conducted. If it is determined that there is no apparent chemical cause of toxicity for the chemicals that were measured a TIE will be initiated.

III. Expand Monitoring Programs into Other Priority Waterbodies (Funded by the Bay Protection Program - $150,000) - The purpose of this study is to investigate whether other priority waterbodies for which there is no or very little information should be on the potential or known hot spot list. In FY 1991-1992 sediment chemistry and toxicity and water column toxicity were measured in marshes and mudflats around the Bay. These sites were considered critical habitats that were either near sources of contamination or for which there was no information. We plan to continue this study to investigate tributaries to San Francisco Bay which will include the Napa and Petaluma Rivers. These investigations will include water column chemistry and toxicity and sediment chemistry and toxicity.

IV. Verification of Hot Spots (Funded by the Bay Protection Program - $86,000) - The purpose of this study is to evaluate potential hot spots with a standard battery of tests to determine if these sites should be changed to known hot spots. Many of the potential hot spots in the San Francisco Bay Region have been listed as potential hot spots because of high sediment chemistry. However, since there are no approved sediment quality criteria, additional tests need to be conducted to determine if these sites are known toxic hot spots under the BPTCP definition established by the Monitoring and Surveillance Task Force. We are requiring responsible parties to conduct these studies. However, For sites where this is not possible we plan gather sufficient data to determine if they should be on the known hot spot list. A standard battery of tests will be performed at these sites to determine whether there is toxicity to aquatic organisms or bioaccumulation above levels that were adopted to protect human health.

V. Monitoring Bioaccumulation in Fish Used for Human Consumption (Funded by the Bay Protection Program $50,000 and the State Mussel Watch Program $35,000 - Total $85,000) - The Department of Health Services has issued a health advisory for consumption of striped bass caught in the San Francisco Estuary. This health advisory is based on data obtained in the 1970's. Current data needs to be collected to determine if this health advisory or health advisories on other fish are appropriate. Striped bass are probably not the only species that have been contaminated in the Estuary, but they are almost the only fish that have been studied. In order to determine the health risk of consuming other fish caught in the Estuary we plan to conduct analysis of fish tissue used for human consumption. Bioaccumulation will be measured in fish that are bottom feeders, such as speckled sanddab and sturgeon, as well as those higher up in the food chain.

ATTACHMENT 2.

References to use and reclamation of sand from dredging.

All documents prepared under contract for the U.S. Army Corps of Engineers.

1. IECO, International Engineering Company, Land Disposal of Dredged Material and Economic Comparison of Alternative Disposal Systems Dredged Disposal Study, San Francisco Bay and Estuary May 1974

2. Nolte and Associates, Final Report, Dredge Disposal Alternatives Study, Task 1, Sand Reuse,

3. Moffatt and Nichol, Engineers, Reduce Dredging Requirement, Final Report, Prepared under the Long Term Management Strategy for Dredging and Disposal, Phase II, Task 3, Work Element C. November 4, 1992

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